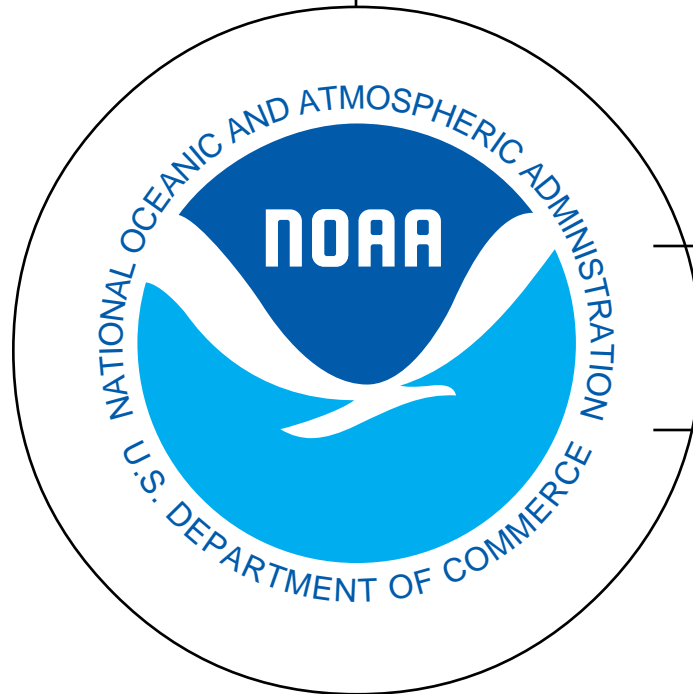


**SPECIFICATION  
FOR  
NOAA  
WEATHER  
INFORMATION  
SERVICE**

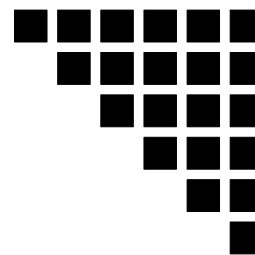
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**NWIS**

**NATIONAL WEATHER SERVICE**





# SECTION C.

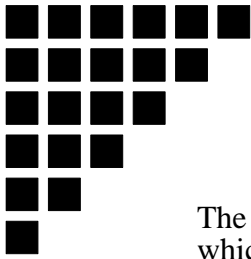
## SYSTEM SPECIFICATION

### C.3 System Specification

#### C.3.1 Scope and Background

The existing NOAA Weather Wire Service (NWWS) is provided via a contractor-furnished and contractor-operated, satellite based system which provides the capability to disseminate more than 5000 NWS weather messages (known as “products”) to more than 1450 customers. From among all these products, each user may pre-select those which are of particular interest to them, by using message headers which are designed to identify each product available in terms of source of the product, category identifier, and specific product designator. These messages range from an informational climatological Outlook, or a River Recreation Statement, to an action oriented Tornado Warning. The system currently utilizes C-band spread spectrum satellite technology. The service is available on a ubiquitous basis anywhere in the United States plus Puerto Rico. Products originate at, and are uplinked from, approximately 60 NWS forecast offices and National Centers, such as the Tropical Prediction Center in Miami. Warning products are consistently delivered within 3-5 seconds with an operational availability exceeding .9996. Details of the current system may be found in Appendix C.12.1.

The NWS intends to replace the existing NWWS with a new service that will have significantly superior performance and will provide a much larger and richer range of products to users. It is the primary intent of this solicitation to procure a service which will meet the high performance standards as described in the specification, in a timely manner, and in a way which is attractive from both a technology and cost basis to end users. This new system will be known as **the NOAA Weather Information Service (NWIS)**. The Contractor shall make user terminals available to subscribers on a lease or purchase basis. The NWS will not be involved in this process, except to the extent that the Offerer shall commit to the pricing of this service in the proposal, and that the economic viability of this pricing to end users will be one of the important evaluation criteria for contract award. Please note that NWS is not specifying any particular type of technology to accomplish this task. The Offerer, however, must clearly show that the technology which is proposed is appropriate, and that it will fully meet the objectives of this RFP. The Offerer may also choose to compare its proposed technology with other types in order to make a convincing case for its use.



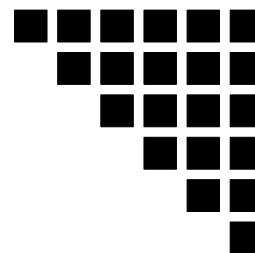
The Contractor shall provide a telecommunications and network management service which fulfills the functions as described below for delivering NWS products to end users in a reliable, timely, and cost effective manner. As previously stated, the network to accomplish this is not constrained by any particular technology, as long as the specifications, objectives, and functionality as defined herein are met. However, the system shall be non-proprietary using a standard, open architecture. The Contractor shall have no exclusive rights to the data delivered by the NWIS. Other system vendors shall be free to market DCE's to receive and process the NWIS products, and users shall be free to supply their own DCEs. The Contractor shall make available, on request and at no charge, sufficient interface information so as to allow a third party to design compatible DCE. All of the above is in conformance with the Government's objective of full and open access to weather information.

As a general concept, the equipment to accomplish these objectives shall consist of the following: (see Figure 1): (1) a network of data communications channels/circuits; (2) associated data communications equipment (DCE); (3) a Network Control Station(s); and (4) associated services. This Contractor provided system shall provide virtual or actual data communication links from NWS data entry/originating locations to NWS and non-NWS receive-only locations. The Government may also allow selected external users (e.g., the Earthquake Center, the Space Environment Center) to have data entry capability onto the contractor-provided NWIS.

The system shall be available to customers on a ubiquitous basis within all areas of the United States, including Alaska and Hawaii, and Puerto Rico, without restriction. More extensive coverage in the Caribbean, Pacific, and offshore coastal areas, though not required, is desirable.

From an administrative viewpoint, the Contractor will, in effect, have two sets of entities to deal with. The first entity is the group of government end users, and the charges thereto will consist of the lease charges associated with up to 150 two-way sites to be located at NWS-owned Weather Forecast Offices (WFO) and Meteorological Centers, plus the approximately 52 non-NWS (receive-only) sites to be located at non-NWS state agencies, plus one (at present) non-NWS two-way site located at the Earthquake Prediction Center in Golden, Colorado, plus any other future additions implemented by the time of contract award. (Note: initially, all sites may not be equipped). The second entity, or group, will be the non-government end users who will be one-way receive-only customers. The contractor will be solely responsible for obtaining, identifying, and serving these customers. The Government makes no guarantees as to the number of users that will subscribe to this service. The intent of the NWIS is to disseminate its products to as wide a base of customers as possible. The Contractor is at liberty and is encouraged to develop as large a base of customers as possible, consistent with the goal of maximum dissemination. The Contractor will deal directly with these customers without the involvement of the NWS, however, the maximum prices to be paid for equipment and services will be established by this contract. The contractor is at liberty to negotiate any volume or special discounts or other terms and conditions for users of their receive-only DCEs.

The services, costs, locations, and interaction with system users for any service options described in Section C.11 that are provided shall be identified and provided separately from those provided for the NWIS core requirements.



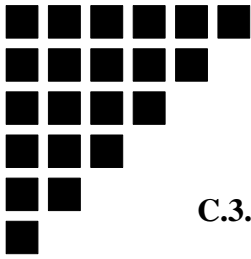
### C.3.2 Applicable Documents

1. Department of Commerce,: National Implementation Plan for the Modernization and Associated Restructuring of the National Weather Service for the fiscal year 1997, 215 pp. 1
2. \_\_\_\_\_, 1989: Strategic Plan for the Modernization and Associated Restructuring of the National Weather Service, 24 pp.
3. \_\_\_\_\_, 1985: Operations of the National Weather Service, 237 pp.
4. National Weather Service, 1990: National Centers Transition Plan, 68 pp. Available from the National Meteorological Center , NWS, Camp Springs, MD.
5. Office of Hydrology, 1989: Hydrometeorological Service Operations for the 1990's, 71 pp. Available from the Office of Hydrology, NWS, Silver Spring, MD.
6. Office of Meteorology, 1993a: Service Transition Plan, Public Warning and Forecast Program, 41 pp. Available from the Office of Meteorology, NWS, Silver Spring, MD.
7. \_\_\_\_\_, 1993b: Service Transition Plan, Aviation Weather Services, 31 pp. Available from the Office of Meteorology, NWS, Silver Spring, MD.
8. \_\_\_\_\_, 1993c: Service Transition Plan, Marine Operations and Services, 33 pp. Available from the Office of Meteorology, NWS, Silver Spring, MD.
9. \_\_\_\_\_, 199: Stage 1 Operations Concept, 57 pp. Available from the Office of Meteorology, NWS, Silver Spring, MD.
10. EIA Standard R-232-C, Interface Between Data Terminal Equipment and Data Communication Equipment Employing Serial Binary Data Interchange.
11. Part 15 of FCC Docket 20780 for Class B Computing Devices.
12. CCITT Recommendation F.140, Section J, Attachment F.
13. Federal Information Processing Standards (FIPS) #146-2: Profiles for Open Systems Internet working Technologies (POSIT)

**(MORE TO BE ADDED)**

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<sup>1</sup> Available from the National Weather Service Headquarters, Silver Spring, MD., unless otherwise noted.



### **C.3.3 Network Design and Effectiveness**

#### **C.3.3.1 General Considerations**

The design requirements of the NWIS are somewhat unique. Whereas most telecommunication systems are designed to allow a predetermined degradation during those periods of adverse weather consistent with published regional climatic data, the NWIS specified system must, in fact, be capable of reliable, consistent and error free operation under extremely adverse weather conditions, due to the very nature and function of the network being to disseminate life-protecting weather alerts under just such situations. Thus, the provider of this service must be acutely aware of those equipment and design considerations which are affected by such a requirement. Examples would be antennas that can operate, not just survive, under high wind conditions, and error correcting schemes (if provided) in which performance degrades gracefully with reduction in signal level as opposed to a precipitous degradation.

In complying with this high operational reliability design requirement, the NWS has established administrative and technical procedures for a back-up site(s) to transmit the NWS products of a primary site in parallel with that site, and to assume the transmission responsibilities of primary sites in the event that the primary site fails. The contractor- provided system shall accommodate this. Notwithstanding the NWS procedures in terms of redundant transmission paths to assure a high operational availability, the Contractor will be held accountable for meeting the reliability, maintainability, and availability requirements as detailed in this specification for the network which the Contractor supplies, without regard to any alternate transmission paths supplied by NWS.

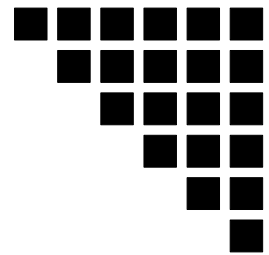
The NWS allows each state to designate one state agency/site as the official interface facility for that state with the NWIS network. The Contractor provided system shall support this arrangement.

The Contractor shall provide all equipment, services, and facilities needed to support the NWS implementation/transition requirements described in this specification.

#### **C.3.3.2 System Capabilities**

##### **C.3.3.2.1 Communication Channels**

All network communication channels shall operate at a data rate which can support all NWS sites operating at a data rate of at least 9.6 kbps (synchronous or asynchronous), and Ethernet LAN interfaces using a TCP/IP protocol operating at 100 Mbps. As an option, the network shall be sized to support the Service Options described in Section C.11. If a TDMA type multiple access is proposed, inroutes of 64 Kpbs minimum and outroutes of 128 Kbps minimum shall be supported.



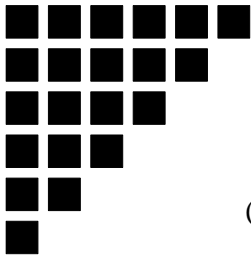
#### **C.3.3.2.2      Sizing**

In terms of sizing the total system, the configuration may be assumed to be as follows:

- (a) There will be 119 Weather Forecast Offices.
- (b) There will be 13 locations (included in the 119) which have co-located Weather Forecast Offices and River Forecast Centers.
- (c) There will be, in addition, up to approximately 31 additional data origination sites, including National Centers and other designated sites.
- (d) There are several possible scenarios in terms of how many total transmit sites may be installed. Regardless of the number of sites implemented, the total system data rate shall be capable of handling the total sum of all WFOs, National Centers, and other designated data entry sites, up to a total of 150 sites.

#### **C.3.3.2.3      Other Characteristics**

- (a) All user sites shall have access to all data entered into the network.
- (b) The system shall be designed so that the contractor's equipment and facilities do not cause messages to be redundantly transmitted.
- (c) Each NWS data entry/originating site shall be provided with the capability and means to monitor its traffic and to notify the system operator when its products are not being broadcast.
- (d) Messages received by the contractor provided system shall be transmitted in accordance with their NWS assigned priority (see Appendix C.12.3).
- (e) The system shall have the flexibility to efficiently allocate resources to accommodate various types of traffic simultaneously and, as necessary, on a dynamically changing basis. This would include stream (i.e., continuous) traffic, contention traffic for lower priorities and/or small message size, and reserved resources for larger batch type transactions. Transmission of large messages on the network shall not disrupt the capability of timely transmission of the smaller messages simultaneously.



- (f) Message entry into the system shall be time stamped and suitably archived for entry and exit traceability.
- (g) Means shall be provided for monitoring the operation of the complete system at the NWS Telecommunication Gateway in Silver Spring, Maryland.

#### **C.3.3.2.4 System Elements**

The overall NWIS shall consist of the following system elements:

- (a) Telecommunications Network.
- (b) Network Control Center
- (c) Data Communications Equipment (DCE), Data Entry/Originating and Receive-Only.
- (d) Data Terminal Equipment (DTE), Data Entry/Originating and Receive Only.

The Contractor shall provide items (a), (b), and (c) as required in this specification and item (d) as an **option**.

#### **C.3.3.3.1 Telecommunications Network**

The Contractor-provided systems shall provide the network capabilities described below:

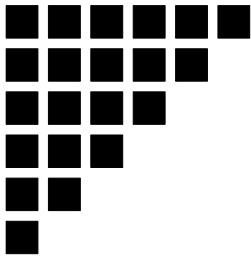
Note: In the following discussion, the term “data” is used generically, i.e., interchangeably with “information” or “message.”

- (a) The network shall provide a capability such that each designated data origination DTE shall be able to transmit NWS meteorological products and to receive flow control and error recovery signals, as required by the protocol design, at the specified data rates. Such design shall be consistent with the delay requirements of Section C.3.2.3. for the prioritized products.
- (b) The network shall provide the capability to receive data from multiple data originating sources, process, and retransmit all such messages to all end users, in accordance with the processing, timeliness, and prioritizing requirements described in this specification. The return data rate shall be consistent with the initial data rate requirements for each data originating station, and take into consideration the expansion requirements as detailed in this specification.





- (c) The system shall be capable of accommodating the types and volumes of data identified in this specification. Some data may be made available only on a subscription basis. The system shall be capable of controlling access to such data.
- (d) The NWS has no requirement for security of data, however, the Contractor shall be responsible for the integrity of all data handled and shall be responsible for preventing data entry by unauthorized users.
- (e) Data received into the system at the data-originating locations and data entered at the network control station(s) may be formatted into packets, encoded for error detection and correction, or compressed at the option of the contractor. All of these functions, however, shall be transparent when data are delivered to the NWS or end user data terminal equipment (DTE).
- (f) No part of the end-to-end data communications network shall have any capability for modifying any data received or transmitted from/to NWS, or end user DTE. *Any such modification is strictly forbidden.*
- (g) When a message is entered into the network, it's time of receipt into the network and time of delivery by the network shall be logged. Furthermore, remote access to the message log , with date and time shall be provided.
- (h) Duplicate messages shall not be transmitted to system users unless the duplicate message was previously entered into the network more than "X" minutes apart. The "X" shall be selectable by the Government, with a range of 0 to 30 minutes. The purpose of "X" minutes is to accommodate valid requests for retransmission and to cover possible errors by operators entering messages into the system. Messages shall be considered redundant when the message identifier and the date/time sequence (DDHHMM) and message character count are identical (see Appendix C.12.3).
- (I) Messages of certain product categories (designated by the Message Header) have a higher priority than others. The message prioritization is described in Appendix C.12.3. The Message Headers and their respective priorities are subject to change to accommodate NWS operational requirements. *The system shall be designed to accommodate such changes by means of software downloads so that downtime will be minimized and that there would be no cost impact.*

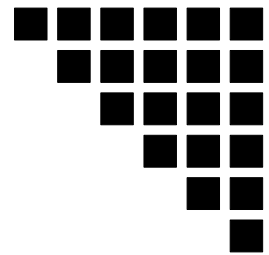


Messages entered into the network and which encounter queues are to be transmitted to end users in priority order (Priority 1, first). Queued messages of the same priority are to be transmitted in the order received (first-in, first-out).

- (j) The system shall discard any partially-received, incomplete, or redundant messages. Partially-received or incomplete messages shall not be used when determining redundancy of subsequently received messages. The system shall record the time, identification, and circumstances of discarded messages.
- (k) Priority 1 messages shall be accommodated without any contention. Such messages are identifiable via the message formats as described in section C.12.3. All other priorities may be accommodated using contention as long as the delay specifications of Appendix C.12.3 are met.
- (l) Communication channel performance shall meet the reliability, maintainability and availability requirements as detailed in section C.3.2.4. The basic criterion shall be a bit error rate of  $10^{-7}$  under the environmental conditions specified and an availability of at least .9979. The communications channel shall be protected and non-pre-emptible, as described in section C.3.4.2.1.

#### **C.3.3.3.2 Network Control Center**

- (a) The Network Control Center shall include all hardware and software needed to provide monitoring of network operations and network control on a continuous basis.
- (b) The network control center shall monitor and record network availability and channel/circuit bit error rates in real time. Any deviations from the required network performance shall be promptly corrected by the Contractor so that the required network availability and error performance are maintained during each base time period as defined in this specification. All deviations that impact network operations shall be promptly reported to NWS.
- (c) The network control center shall include adequate protection to ensure no data loss or data delivery interruption resulting from power failure or power surges.
- (d) The network control center configuration shall have provisions such that in the case of a debilitating failure at the center, that all critical functions shall be taken over by a backup center which is physically separated from the prime center. The procedures for switchover, whether manual or automatic, shall be clearly delineated and included with the systems operations manual.



### **C.3.3.3.3 Data Communications Equipment (DCE)**

#### **C.3.3.3.3.1 General**

The Contractor shall provide, install, and maintain all of the Data Communications Equipment (DCE) and interconnecting cables needed to interface NWS and non-NWS data entry DTEs and end-user (including NWS) receive-only DTEs with the contractor-provided NWIS network. The contractor DCE (both data entry and receive-only) shall be capable of operating at the data rates and protocols as defined in this document.

#### **C.3.3.3.3.2 Data Entry/Originating Data Communications Equipment**

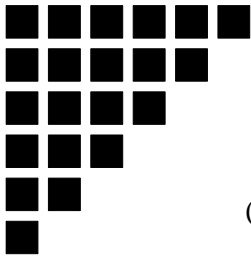
The Contractor shall provide, as needed, a network flow control mechanism to control the flow of data from his DCE into the network in order to prevent any loss of data. Any such flow control mechanism shall be needed and used only during unusual system traffic/failure modes and not as a normal routine aspect of the system. The DCE shall be able to accommodate a minimum data rate of 9.6 kbps with an expansion capability to 19.2 kbps.

The existing AFOS network, described in Appendices C.12.1 and C.12.6, is currently being replaced by AWIPS, described in Appendices C.12.2 and C.12.5. The Contractor-supplied equipment must be fully compatible with both systems. Message headers and formats for both systems are described in Appendices C.12.3 and C.12.4. In addition, as an **option**, a format conversion capability as described in paragraph (j) of this section shall be offered.

Each data-originating site shall be able to transmit NWIS data when it is available (under the control of the flow control mechanism). All data-originating stations in the system shall be able to transmit data into the network, with access such that it is consistent with the requirements for timely delivery of the products in accordance with their priority status, as specified herein. Routine polling of the data-originating sites' DCE from a network control station(s) is **not** an acceptable means of controlling peak data flows in the network.

The contractor-provided data communications equipment (DCE) at data-originating sites shall also meet the following requirements:

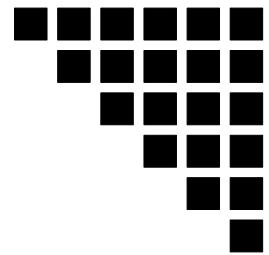
- (a) A data transfer interface to the network using serial asynchronous protocol, two-way, and data flow control interface between the contractor-provided network and the DTE that does not adversely impact normal operation of the data entry/originating DTE (AWIPS computer at NWS WFO locations).
- (b) Each DCE provided at data-originating sites shall have a unique network address
- (c) The capability of receiving and processing the control signals from the contractor-provided data communications network.



- (d) The DCE shall have built-in self- checking diagnostics.
- (e) The DCE shall provide operating personnel with an indication that inherent self-checking diagnostic capabilities are operating properly, and to verify that the system has successfully passed the diagnostic test.
- (f) The DCE shall have built-in diagnostic capability to permit service diagnosis and correction from a centralized control location (s).
- (g) The DCE shall have built-in fault indicators to alert operating personnel to an equipment malfunction. This fault indication shall be available on a Contractor-supplied display. In addition, as an option, the Contractor shall provide for the alarm to be integrated into the AWIPS console display. Faults to be alarmed shall include, but not be limited to uplink transmit failure and/or data input failure.
- (h) As an option, the Contractor shall provide the capability to display all alarms, system status, and message traffic on the optional DTE or on an X-terminal operating on the AWIPS LAN. The interface to AWIPS is described in C.12.5.
- (I) The DCE shall have adequate protection to ensure no data loss or data delivery interruption resulting from power failure or power surges, and that any failure is of the “graceful” variety rather than a catastrophic. Provisions for connecting the DCE into the Government-provided UPS shall be included. The DCE shall monitor system operation such that the broadcast of each transmitted message is verified and the operator notified of any disparities.
- (j) As an **option**, the Contractor shall provide the transmit DCE with the capability to accept an AFOS PIL header and to translate it into a valid abbreviated WMO heading. These headers are described in Appendix C.12.3.

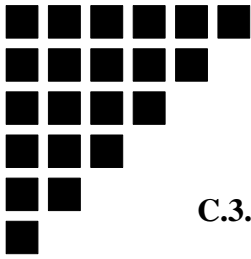
#### **C.3.3.3.3.3 Receive-Only DCE**

For end-user locations where all of the received data is to be collected directly from the NWIS data stream, the DCE may OR may not (depending upon the NWIS data stream rate) require internal message buffer or data storage capability. The required data storage and/or product selection capability external to the DCE should be supplied by the end user or in the optional DTE.



The contractor-provided data communications equipment (DCE) at receive-only locations shall also meet the following requirements:

- (a) The capability of data character transmission from the DCE using a non-proprietary standards based protocol, one-way, with a minimum data speed of 9.6 kbps. Service options may require a higher data rate.
- (b) DCE shall have a unique network address for Government users.
- (c) DCE shall have built-in self-checking diagnostics.
- (d) DCE shall have a visual indicator(s) to provide operating personnel with an indication that inherent self-checking diagnostic capabilities are operating properly.
- (e) DCE shall have built-in diagnostic capability to permit service diagnosis from the network control station(s).
- (f) DCE shall have built-in fault indicators to alert operating personnel to equipment malfunctions.
- (g) DCE shall have adequate protection to ensure no data loss or data interruption resulting from power failure or power surges.
- (h) The DCE shall be capable of identifying products based upon both a combination of the product message header, described in section C.12.3, and the Unified Universal Geographic Code (UGC), described in section C.12.4. The product selection process shall begin with identification of the message headers of interest followed by a search of the received product for desired UGC components. The DCE shall have the capability for selecting an unlimited number of product types using the product message header and a minimum of 100 different UGCs. There may be a number of different UGCs that simultaneously apply to a particular location (i.e., county, zone) and portions of a state (a place can be in the north, northeast, and east part of a state at the same time). The end user shall be able to specify at least 10 different UGCs that may be of interest to him for any particular product.



#### **C.3.3.3.4 Data Terminal Equipment (DTE)**

Weather products to be entered and transmitted on the contractor-provided NWIS system will be collected and assembled according to priority and time schedule in a data processor in the NWS DTE (AFOS or AWIPS computer) at the NWS data-originating locations..

Data will be transmitted from all designated data entry/originating locations to the contractor DCE using the 8-level ASCII data code at a speed of 1200 bps or higher. All data entered by NWS and NWS-authorized DTEs will have the format described in Appendix C.12.3.

#### **C.3.3.3.5 Optional DTE**

As an **option**, the Contractor shall provide DTE that will perform the following functions at NWS data entry sites:

- (a) Monitoring of traffic sent and received to provide transmission verification and to provide real time statistics on volume, peak traffic times, delays, etc.
- (b) Graphic interactive displays of products
- (c) Alarms for products sent but not received

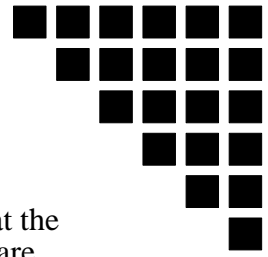
#### **C.3.3.4 Reliability, Maintainability, Availability**

##### **C.3.3.4.1 Definitions**

The determination of end-to-end system network availability shall include the following elements:

- (a) data origination transmit/receive at NWS sites
- (b) space or terrestrial link, including, in the case of satellite links: satellite equipment, the link, and sun outages where applicable
- (c) hub collection point (if provided) receive equipment

The availability shall be defined from the data entry point to the data receive point.



Maintainability is defined as the level of effort and support required to assure that the system meets operational requirements. Maintenance and support requirements are specified in Section C.6.

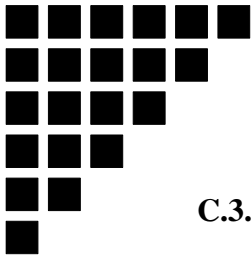
Reliability is defined as the Mean Time Between Failures, and is equal to  $e^{-t/(MTBF)}$  where “t” is in hours. When calculating MTBF, the Contractor shall **not** divide the result among all DCEs in the network.

#### C.3.3.4.2 Availability

The Contractor shall meet the following requirements at a Bit Error Rate of  $10^{-7}$  for the received data stream when either or both transmit and receive stations are experiencing environmental conditions described in this specification. The margin which the system design includes over this minimum shall be stated. The calculations shall be consistent with the type of network which the Contractor is providing. Table 1.3-1 and the following discussion is an example based on a point to multipoint to point satellite link in which all products are received at a hub for point to multipoint broadcast to end users.

TABLE 1.3-1

Components	Availability	MTBF	MTTR
Hub E.S. Uplink	0.9999		1/4 Hour
Satellite Link	0.999		TBD
Cust. Receive E.S.	0.999		12 Hours
Total	0.9979	40,000	



#### **C.3.3.4.2.1 Space or Terrestrial Link**

The network channels/circuits provided by the contractor shall have an availability of 0.999 or better per year. This includes the relay equipment (e.g., satellite) and the link itself (e.g. space link). In the case of a space segment link, *such segment shall be “protected” (i.e., backed up in case of transponder or satellite failure) and “non-pre-emptible” (i.e., not subject to pre-emption by other users of the satellite). The Offeror shall discuss any alternative backup schemes which are available, up to and including the procedures for backup due to a catastrophic failure of the entire spacecraft. This discussion shall include procedures for backing up both the spacecraft and any necessary steps to make both the NWS and non-NWS ground terminals compatible with the requirements of the backup spacecraft. The discussion shall include the guaranteed maximum period of time for restoration of the network. In the case of several scenarios, the price impact shall be discussed in the appropriate pricing section of the Offerors proposal.* (See Section C.12.8)

#### **C.3.3.4.2.2 Network Control Station(s)**

The network control station(s) shall have an availability of at least 0.9999 per year.

#### **C.3.3.4.2.3 Network Communications Equipment**

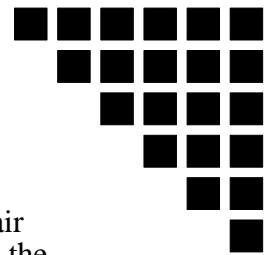
All data communications equipment (DCE) provided shall have an availability of 0.999 or better, on a yearly basis, measured over a 90-day moving average. Excluded from the base time period will be any period where an operational failure is attributable to something other than NWIS.

All failures will be acted upon and corrected in a minimum amount of time. The maximum restoration time for any failure shall not exceed 12 consecutive hours (including nights, weekends, and holidays, regardless of the contractor’s normal business hours). Outage start and end times specified in Section C.3.4.1. apply to DCE failures.

#### **C.3.3.4.2.4 End-to-End Link Performance**

The end-to-end link performance, consistent with the requirements above, shall be 0.998 between all WFO’s and the hub. Each set of WFO uplink- to- hub connections (if that is the configuration provided) shall be considered to be acting individually, in parallel, with no compensation for the total number of sites. All failures shall be acted upon and corrected in a minimum amount of time. The maximum restoration time for any failure shall not exceed 15 minutes at the hub (if provided) and 12 hours at the remote sites (including nights, weekends, and holidays, regardless of the contractor’s normal business hours). The outage time starts when the contractor is notified of a problem and includes both travel and repair time. Notwithstanding this requirement, the restoration time shall be such as to assure meeting the overall availability requirements.





The Offeror shall provide a detailed link telecommunications analysis for both fair weather and degraded conditions. In the case of a satellite communications link, the parameters identified in Appendix C.12.8 shall be included in the analysis. This analysis, at a minimum, shall include link power budgets at various data rates and availability figures under typical and adverse conditions. This analysis shall be performed for enough locations to demonstrate that all specifications will be met by the proposed system selected for all specified locations, and shall include the worst case performance location and the best case performance location. This analysis shall cover degraded performance during extreme environmental conditions as a function of desired availability, as well as solar outages, adjacent satellite and cross polarization interference (if a satellite transmission system is proposed). For non-satellite links, the equivalent factors shall be identified. After Contract award, the Contractor shall supply a more detailed analysis, including sub elements as well as system elements, for submission at the first Design Review Meeting.

### **C.3.4 Physical and Installation Requirements**

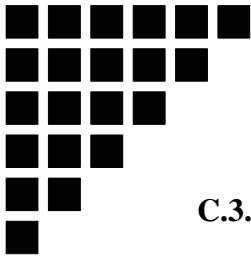
#### **C.3.4.1 General**

The contractor shall implement a system utilizing equipment, interfacing circuits, and interconnections which will meet the performance requirements of this specification. The contractor shall furnish to the Government, equipment conforming to accepted commercial engineering standards and suitable for continuous operation (24 hours per day, year round) with reasonable maintenance periods. Reliability, maintainability, and stability of performance shall be prime considerations in the selection, purchase, and design of components parts and sub-systems. Human factors shall be fully considered in the design of operator controls and displays and in the accessibility of component parts and sub-systems to maintenance personnel. All potential hazards to operating and maintenance personnel are to be minimized or eliminated by the system design.

The system shall cause no electromagnetic (emitted or conducted) interference-related negative effects on nearby ADP, communications, or other electronic equipment. The system shall be tested by an independent FCC-certified test facility for compliance with Part 15 of FCC Docket 20780 for Class B computing devices. Should this testing demonstrate Class B compliance, the system shall be registered with the FCC. Compliance with the above FCC standard shall satisfy this requirement that the system is satisfactorily tested.

All potential hazards to people and equipment are to be minimized through the application of adequate measures and devices which will limit voltages and currents, during fault conditions, below the dielectric breakdown strength and time-current capabilities of the system and its components.

The contractor shall provide all items necessary to ensure proper operation of equipment provided.



#### **C.3.4.2 Power Requirements**

All contractor provided equipment shall be capable of operating from a 117 V (+10%) AC, 60 Hz (+3Hz), power source and consuming no more than 500 watts under normal operating conditions. Special requirements for power for operating under other than normal conditions must be identified.

#### **C.3.4.3 Cabling**

The contractor shall provide a suitable cable (up to 100 feet in length) with suitable connectors for connection of the contractor's DCE to the NWS DTE, and the non-NWS DTE at designed entry/originating locations.

The contractor shall provide a suitable cable up to (up to 50 feet in length) with standard EIA connectors for connection of the contractor's DCE to the end-user (both NWS and non-NWS) receive only DTE.

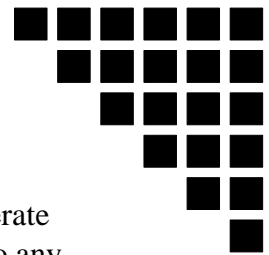
Cabling shall meet local codes and be plenum-rated for installation at NWS facilities.

#### **C.3.4.4 Environmental Factors**

Contractor provided equipment shall be designed to minimize impact on NWS facilities and shall conform to the following requirements::

- (a) Acoustic noise generated by any indoor equipment provided as part of the system shall not exceed the limits shown in the table below when measured at the point of highest noise level at a distance of 5 feet from the exterior surface. Reference pressure for this noise limit is 0.0002 dynes per square centimeter.

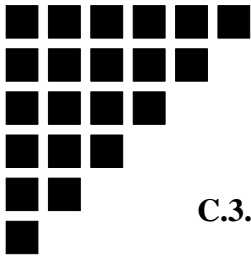
<b>Frequency Band (HZ)</b>	20 - 75	75 - 150	150 - 300	300 - 600	600 - 1200	1200 - 2400	2400 - 4800	4800 - 9600	9,600 - 20,000
<b>Limit (DB)</b>	79	68	59	52	48	45	43	42	45



- (b) Any indoor equipment provided as part of the system shall be able to operate in compliance with all requirements of this specification when exposed to any combination of the following:

<b>Temperature:</b>	55 degrees to 120 degrees (F).
<b>Humidity:</b>	10% to 92% R.H.
<b>Combined Temp. and Humidity:</b>	90 degrees F/55% R.H.
<b>Altitude:</b>	Sea level to 7,000 feet (higher if required at user site)
<b>Dust:</b>	Typical of light industrial areas.
<b>Fungus:</b>	Typical of inland and coastal areas.

- (c) Any outdoor equipment provided as part of the system at NWS sites shall be capable of operating over a temperature range of -40 degrees (C) to +50 degrees (C), with a relative humidity of 0-100%, without performance degradation. Any furnished outdoor equipment shall also be able to operate and provide the required availability in the environment described in Appendix **C.12.7**. Note that in regions where appropriate, this will include a requirement that the equipment be **operational** in winds of 125 mph and rainfall in excess of 2.5 inches per hour, and the Contractor's design of all such equipment must take into consideration this requirement. In the case of non-NWS end user sites, the operational environmental conditions are a matter of agreement between the equipment provider and the end user.
- (d) Any indoor equipment provided as part of the system at NWS facilities shall be capable of operating without necessitating any modification/addition to existing air conditioning/ventilation systems.



#### **C.3.4.5 Installation**

- (a) The contractor shall not ship equipment to NWS installation sites in advance of the contractor's installation personnel being on-site ready to install the equipment.
- (b) All equipment shall be installed by the contractor in accordance with equipment manufacturer's recommendations, following good engineering practices, and in compliance with any applicable national, state, or local codes, as well as any labor contracts in effect at the site that may affect the installation, in addition to all NWS requirements, as specified in Section C.4.
- (c) All installation materials and labor shall be provided by the contractor, with the exception that the designated site representative may assist in connecting contractor-supplied cables between the contractor's DCEs and the NWS DTE.
- (d) After installation of the NWS site equipment is completed by the contractor, proper operation and testing of the equipment shall be demonstrated to the Government designated site representative, as specified in Section E. If the installation, operation, and test performance is considered satisfactory by the designated site representative, an installation completion form will be signed by the representative, for the installation contractor, certifying that the equipment has been installed and tested, and that operation of the network equipment has been demonstrated and found to be acceptable.

#### **C.3.4.6 Inspections**

The Government reserves the right to have the COTR or other designated personnel conduct selected spot checks at NWS facilities in the field to ensure that installation specifications have been adhered to and that the quality of finished work is acceptable.